In the Specification:

Please delete paragraph 0005 and replace it with the replacement paragraph set forth below. A copy of the replacement paragraph in marked form appears in Appendix 1.

Figure 1A is a cross-section of a device layer 105 that exhibits an undesirable etch profile known as "footing." Footing occurs when the doped silicon dioxide that is in the lower portion 107 of layer 105 is etched at a faster rate than the doped silicon dioxide that is in the upper portion 109 of layer 105.

Please delete paragraph 0033 and replace it with the replacement paragraph set forth below. A copy of the replacement paragraph in marked form appears in Appendix 1.

In an exemplary embodiment, contact holes etched into a phosphorous-doped silicon dioxide (PSG) layer formed by the method of Figure 5 have a good etch profile with straight sidewalls and without footing. In this example, two mass flow controllers control the SiH_4 flowrate, the PH_3 flowrate, and the dopant/silicon ratio. One mass flow controller is connected to a 100% SiH_4 source and the other mass flow controller is connected to a 50% SiH_4 /50% PH_3 source. Specific conditions used to form the PSG layer are listed in Table 1, below.

In the Claims:

Please amend Claims 4, 5 and 14 and add new Claims 21-25 as set forth below. A copy of the amended claims and new claims, in marked form, appears in Appendix 2. A copy of all of the pending claims, including any amendment or addition herein, in clean form, appears in Appendix 3.

4. (Amended) The method of Claim 1, further comprising determining a duration of the initial period by measuring a temperature of the wafer during a test deposition of a doped silicon dioxide layer, wherein the duration is the time required for the temperature to reach an essentially constant value.

5. (Amended) The method of Claim 1, further comprising:

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test depositions performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant,

whereby the initial value of the ratio is determined.

14. (Amended) The method of Claim 11, further comprising:

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test depositions performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant, whereby a set of values of the ratio to be used during the deposition are determined.

21. (New) A method for depositing a doped silicon dioxide layer onto a wafer, the method comprising:

introducing a dopant precursor gas having a dopant precursor gas flow rate and a silicon-containing gas having a silicon-containing gas flow rate into a plasma, wherein a ratio of the dopant precursor gas flow rate to the silicon-containing gas flow rate has an initial value;

increasing the ratio from the initial value to a final value during an initial period;

determining a duration of the initial period by measuring a temperature of the wafer during a test deposition of a doped silicon dioxide layer, wherein the duration is the time required for the temperature to reach an essentially constant value; and

maintaining the ratio at the final value during a final period,

wherein during the initial period and the final period the dopant precursor gas and the silicon-containing precursor gas react in the plasma to form the doped silicon dioxide layer on the wafer.

22. (New) A method for depositing a doped silicon dioxide layer onto a wafer, the method comprising:

introducing a dopant precursor gas having a dopant precursor gas flow rate and a silicon-containing gas having a silicon-containing gas flow rate into a plasma, wherein a ratio of the dopant precursor gas flow rate to the silicon-containing gas fiow rate has an initial value;

increasing the ratio from the initial value to a final value during an initial period;

maintaining the ratio at the final value during a final period, wherein during the initial period and the final period the dopant precursor gas and the silicon-containing precursor gas react in the plasma to form the doped silicon dioxide layer on the wafer; and

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test depositions performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant, whereby the initial value of the ratio is determined.

23. (New) A method for depositing a doped silicon dioxide layer, the method comprising:

introducing a dopant precursor gas and a silicon-containing gas into a plasma at a dopant precursor gas flow rate and a silicon-containing gas flow rate for a deposition period;

adjusting, during the deposition period, a ratio of the dopant precursor gas flow rate and the silicon-containing gas flow rate as a function of wafer temperature, whereby the dopant precursor gas and the silicon-containing gas react in the plasma to form the doped silicon dioxide layer having a defined dopant concentration;

measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function of the ratio for a first series of test depositions performed at a constant temperature;

repeating the measurement of dopant concentration for a second series of test deposition performed at a different constant temperature; and

measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant,

whereby a set of values of the ratio to be used during the deposition are determined.

24. (New) The method of Claim 23, wherein:

the temperature profile comprises an initial period during which the temperature of the wafer is increasing and a final period during which the temperature of the wafer is constant; and

during the deposition the ratio is increased from an initial value to a final value during the initial period and the ratio is held at the final value during the final period.

25. (New) The method of Claim 24, wherein increasing the ratio from the initial value to the final value comprises: